Reduction of multiresistant Salmonella Typhimurium DT104 in Danish swineherds – new strategy

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Summary: From ultimo 1996 to medio 2000, all Danish swineherds infected with multiresistant Salmonella Typhimurium DT104 (=DT104) were stamped out. This strategy was changed medio 2000 and is now based on reduction of DT104 on herd level. When DT104 is detected in a swineherd, the farm and its contact farms are closed for contact with other farms. Contact herds are examined by faecal samples. An intervention plan is worked out and concerns feed, management, health conditions, cleaning and disinfections, infection-barriers and handling of slurry and manure.
Swine from DT104-infected herds are slaughtered under special hygiene precautions.
Herds can be declared "free" of DT104-infection, based on bacteriology or serology depending on herd-type. So far 15 herds have been declared free of the infection and 19 herds have started the testing procedure to be declared "free". The conclusion is, that it is possible to reduce DT104 on herd level in most cases.

Keywords: Salmonella-reduction, intervention, pork

Introduction: From ultimo 1996 to June 2000 all swineherds infected with DT104 were stamped out. A new Danish DT104-strategy was developed in cooperation with the Veterinary authorities and the swine-, cattle and poultry industries. Reduction of DT104 in swineherds was started the 1st of July 2000 even though the new reduction strategy first was implemented in December 2000. From July 2000 to ultimo June 2001, 53 swineherds have been involved in this new strategy.

Materials and Methods: The swineherds were mainly detected as a result of the Danish Salmonella Surveillance and Control Program and subsequently tracing to contact herds. A few herds were detected as a result of an autopsy. Table 1 shows the herds divided into type of herd and the cause of bacteriological examination, where DT104 was detected.

Table 1: Herds included in the reduction strategy divided into herd-type and cause of the bacteriological examination, where DT104 was detected.

Type of herd/bacteriological examination	Farrow to grower herds	Farrow to finisher herds	Grower to finisher herds	Total number of herds
Salmonella Surveillance and Control Program	4	5	9	18
Traced to contact herds	5	2	22	29
Autopsy	1	3	2	6
Total number of herds	10	10	33	53

The reduction strategy is initiated immediately after detection of DT104 in a herd and the farm and its contact farms are closed for contact with other farms due to a Zoonosis Restriction Order from the District Veterinary Officer. Contact herds are examined by pooled pen faecal samples twice within three days to determine whether DT104 is present or not.

Animals from infected farms can be sold to other farms, but then these farms will also be given a Zoonosis Restriction Order.

The herd owner and an advisor from the relevant livestock commission work out a herd intervention plan. It must be approved by the District Veterinary Officer and followed for at least 12 months. The plan concerns feed, management, health conditions, cleaning and disinfections, internal and external infection-barriers including rodent control and special handling of slurry and manure. Overall the cereal feed must contain minimum 25% barley, and if pelleted feed is used 25% of the cereal must not be heat-treated nor pelleted. If fermented wet feed is used the pH must be 4.7 or lower. An organic acid is added to either drinking water or feed. The management of the farm is evaluated and critical points are adjusted e.g. reducing herd-size to avoid overcrowding and avoid contact between pigs of different ages. The plan contains also advice on cleaning and disinfections. Diseases must be controlled. DT104 strains in Denmark are normally sensitive to quinolones and to avoid resistance, quinolones can't be used for treatment of any disease. We focus on both the internal and external infections-barriers to avoid spreading of DT104 within the herd and between the herd and the environment. It is also mandatory to have a rodent control program. Slurry must be deposited with a hose applicator and both slurry and manure must be ploughed in immediately after. If a quantitative examination of slurry shows that there is less than 1 c.f.u per gram slurry, ploughing can be left undone. Swine from DT104-infected herds are slaughtered under special hygiene precautions in order to protect the consumers.

Farrow to grower herds can be declared "free" of DT104 infection, if DT104 is not present in two examinations of pooled pen faecal samples from the herd within 30 days. Each examination must consist of 20 pooled faecal samples from both

weaners and gilts. Finisher herds and farrow to finisher herds can be declared "free"of the infection based on data from the ongoing serological surveillance using the Danish mix-ELISA. A salmonella-index is calculated every month for each herd. This is a weighed average (3:1:1) based upon samples from the previous three months, where samples from the last month are weighed three times more than samples from the two previous months. The cut-off used is OD% 20. A herd can be declared "free" of DT104, if the calculated salmonella-index is 20 or below for four months in a row.

Results: So far 15 herds have been declared "free" of DT104. Another 19 herds are under testing to be declared "free" and the last 19 herds are not ready to start the testing procedure by June 2001 as shown in table 2.

Table 2: Herds included in the reduction strategy divided into herd-type by June 2001.

Type of herd/testing	Farrow to grower herds	Farrow to finisher herds	Grower to finisher herds	Total number of herds
Declared "free"	3	3	9	15
Under testing	4	1	14	19
Testing not started	3	6	10	19
Total number of herds	10	10	33	53

Discussion and conclusions: It has been possible to implement the intervention plan for all the herds, and the farmers in general have been cooperative and positive. The time it takes to reduce the level of DT104 in a herd and subsequently declare the herd "free" of DT104 depends on many factors within the herd. Based on the data from the last year, where the new strategy has been followed, it seems likely that a finisher herd in general can be declared "free" six months after detection of DT104 if the intervention plan is followed carefully, and for farrow to grower and farrow to finisher herds it takes longer. The next year will give us more experience on how long time it normally will take to reduce DT104 in the different herd-types. There are probably also some herds where it is impossible to reduce DT104 to an acceptable level. It can be concluded that it is possible to reduce DT104 in most herds, reducing the risk of spreading DT104 to other herds, environment and finally decrease the level of DT104 in pork.